

CLAIM 1 - CLEAN VERSION

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D)

1. (Twice Amended) A multi-layer tube, comprising:

a metal tube having an outer surface;

a zinc layer bonded to the metal tube outer surface wherein the zinc layer is selected from the group consisting of zinc plating, zinc nickel alloys, zinc cobalt alloys, zinc aluminum alloys, and mixtures thereof;

a surface treatment layer bonded to the zinc layer, wherein the surface treatment layer is selected from the group consisting of a zinc/aluminum/rare earth alloy, phosphate, chromate, and mixtures thereof;

a priming layer capable of spray application;

a first polymeric layer bonded to the priming layer, wherein the first polymeric layer is selected from the group consisting of melt-processible thermoplastic elastomers, melt-processible ionomers, melt-processible nylons, melt-processible fluoropolymers, and mixtures thereof; and

a second polymeric layer bonded to the first polymeric layer, wherein the second polymeric layer is selected from the group consisting of melt-processible nylons, melt-processible thermoplastic elastomers, melt-processible fluoropolymers, and mixtures thereof.

NEW CLAIM 32

32. (New) The multi-layer ~~tube~~ of claim 1, wherein the priming layer comprises one or more phenols.

cd

NEW CLAIM 33

33. (New) The multi-layer tube of claim 32, wherein the priming layer comprises carbolic acid.

C2

NEW CLAIM 34

34. (New) The multi-layer tube of claim 1, wherein the first polymeric layer consists essentially of an ionomer and a nylon.

cd

NEW CLAIM 35

35

35. (New) The multi-layer tube of claim 34, wherein the priming layer comprises one or more phenols.

02

NEW CLAIM 36



36. (New) The multi-layer tube of claim 35, wherein the priming layer comprises carbolic acid.

CD

NEW CLAIM 37

37

37. (New) The multi-layer tube of claim 36, wherein the ionomer of the first polymeric layer is ethylene methacrylic acid copolymer—partial metal salt, and the nylon of the first polymeric layer is Nylon 12

07

NEW CLAIM 38

38. (New) The multi-layer tube of claim 37, wherein the ethylene methacrylic acid copolymer—partial metal salt comprises from about 10% to about 70% of the first polymeric layer, and wherein the Nylon 12 comprises from about 90% to about 30% of the first polymeric layer.

C.2

NEW CLAIM 39

602

39. (New) The multi-layer tube of claim 38, wherein the Nylon 12 is characterized by a low viscosity and low molecular weight.

CD

NEW CLAIM 40

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40. (New) The multi-layer tube of claim 1, wherein the zinc/aluminum/rare earth alloy of the surface treatment layer consists essentially of from about 85% to about 97% Zn, from about 3% to about 15% Al, and at least 5 ppm of a rare earth-containing alloy.

CD

NEW CLAIM 41

41. (New) The multi-layer tube of claim 40, wherein the surface treatment layer has a weight in the range of from about 37.3 g/m² to about 97.7 g/m².

CD

NEW CLAIM 42

42

42. (New) The multi-layer tube of claim 41, wherein the priming layer comprises one or more phenols.

Ch

NEW CLAIM 43



43. (New) The multi-layer tube of claim 32, wherein the priming layer comprises carbolic acid.

CD

NEW CLAIM 44

44. (New) The multi-layer tube of claim 1, wherein the zinc layer has a thickness in the range of from about 10 μ to about 25 μ .

CR

NEW CLAIM 45

45. (New) The multi-layer tube of claim 1, wherein the second polymeric layer consists essentially of a nylon.

OK

NEW CLAIM 46

Sub 17 46. (New) The multi-layer tube of claim 45, wherein the nylon is Nylon 12.

CH

NEW CLAIM 47

6/27/54 47. (New) The multi-layer tube of claim 46, wherein the Nylon 12 is characterized by a low viscosity and low molecular weight.

CR

NEW CLAIM 48

Sub 2 48. (New) The multi-layer tube of claim 1, wherein the first polymeric layer and the second polymeric layer have a combined thickness in the range of from about 75 μ to about 300 μ .

OK

NEW CLAIM 49

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2/1/17

49. (New) The multi-layer tube of claim 48, wherein the first polymeric layer and the second polymeric layer have a combined thickness in the range of from about 125 μ to about 250 μ .

CD

NEW CLAIM 50

50. (New) A multi-layer tube, comprising:

a metal tube having an outer surface;

a zinc layer bonded to the metal tube outer surface wherein the zinc layer is selected from the group consisting of zinc plating, zinc nickel alloys, zinc cobalt alloys, zinc aluminum alloys, and mixtures thereof;

a surface treatment layer bonded to the zinc layer, wherein the surface treatment layer is selected from the group consisting of a zinc/aluminum/rare earth alloy, phosphate, chromate, and mixtures thereof;

a priming layer comprising one or more phenols;

a first polymeric layer bonded to the priming layer, wherein the first polymeric layer is selected from the group consisting of melt-processible thermoplastic elastomers, melt-processible ionomers, melt-processible nylons, melt-processible fluoropolymers, and mixtures thereof; and

a second polymeric layer bonded to the first polymeric layer, wherein the second polymeric layer is selected from the group consisting of melt-processible nylons, melt-processible thermoplastic elastomers, melt-processible fluoropolymers, and mixtures thereof.

NEW CLAIM 51



51. (New) The multi-layer tube of claim 50, wherein the priming layer comprises carbolic acid.

NEW CLAIM 52

52. (New) The multi-layer tube of claim 51, wherein the ionomer of the first polymeric layer is ethylene methacrylic acid copolymer—partial metal salt, and the nylon of the first polymeric layer is Nylon 12.

C2

NEW CLAIM 53

53. (New) The multi-layer tube of claim 52, wherein the zinc/aluminum/rare earth alloy of the surface treatment layer consists essentially of from about 85% to about 97% Zn, from about 3% to about 15% Al, and at least 5 ppm of a rare earth-containing alloy.

NEW CLAIM 54

54. (New) The multi-layer tube of claim 53, wherein the ethylene methacrylic acid copolymer—partial metal salt comprises from about 10% to about 70% of the first polymeric layer, and wherein the Nylon 12 comprises from about 90% to about 30% of the first polymeric layer.

C2

NEW CLAIM 55

55. (New) The multi-layer tube of claim 54, wherein the surface treatment layer has a weight in the range of from about 37.3 g/m² to about 97.7 g/m².

C²

NEW CLAIM 56

56. (New) The multi-layer tube of claim 55, wherein the second polymeric layer consists essentially of a nylon.

NEW CLAIM 57

57. (New) The multi-layer tube of claim 56, wherein the nylon is Nylon 12.

C2
Lent
P1

NEW CLAIM 58

58. (New) The multi-layer tube of claim 57, wherein the Nylon 12 is characterized by a low viscosity and low molecular weight.

NEW CLAIM 59

C2 59. (New) The multi-layer tube of claim 58, wherein the first polymeric layer and the second polymeric layer have a combined thickness in the range of from about 125 μ to about 250 μ .

NEW CLAIM 60

60. (New) The multi-layer tube of claim 59, wherein the first polymeric layer and the second polymeric layer have a combined thickness in the range of from about 75 μ to about 300 μ .

NEW CLAIM 61

C 2 Sub Δ 61. (New) The multi-layer tube of claim 60, wherein the zinc layer has a thickness in the range of from about 10μ to about 25μ .
